

## Beliefs for Teaching and Learning Mathematics

### Unproductive Beliefs

Mathematics learning should focus on practicing procedures and memorizing basic number combinations.

Students need only to learn and use the same standard computational algorithms and the same prescribed methods to solve algebraic problems.

The role of the teacher is to tell students exactly what definitions, formulas, and rules they should know and demonstrate how to use this information to solve mathematics problems.

Students can learn to apply mathematics only after they have mastered the basic skills.

The role of the student is to memorize information that is presented and then use it to solve routine problems on homework, quizzes, and tests.

An effective teacher makes the mathematics easy for students by guiding them step by step through problem solving to ensure that they are not frustrated or confused.

### Productive Beliefs

Mathematics learning should focus on developing understanding of concepts and procedures through problem solving, reasoning, and discourse.

All students need to have a range of strategies and approaches from which to choose in solving problems, including, but not limited to, general methods, standard algorithms, and procedures.

The role of the teacher is to engage students in tasks that promote reasoning and problem solving and facilitate discourse that moves students toward shared understanding of mathematics.

Students can learn mathematics through exploring and solving contextual and mathematical problems.

The role of the student is to be actively involved in making sense of mathematics tasks by using varied strategies and representations, justifying solutions, making connections to prior knowledge or familiar contexts and experiences, and considering the reasoning of others.

An effective teacher provides students with appropriate challenge, encourages perseverance in solving problems, and supports productive struggle in learning mathematics.